



## What caused the March 2021 flood?

The March 2021 flood in the Hawkesbury-Nepean Valley was caused by significant rainfall across the catchment from 16 to 23 March 2021. This included:

- 157mm of rainfall at Warragamba over 24 hours from 9am 20 March to 9am 21 March 2021
- 536mm of rainfall at Blackheath in the 8 days from 9am 16 March to 9am 24 March 2021.

Initial analysis suggests the Warragamba catchment contributed about 60% of floodwaters to Windsor. The other catchments contributed around 40% of floodwaters.

## What happened during the March 2021 flood?

While the March 2021 flood was not a particularly rare or large event in the Hawkesbury-Nepean, there were some significant impacts in the valley including:

- approximately 610 residences impacted by floodwaters
- more than 30 caravan parks severely impacted by floodwaters, including 1450 manufactured homes
- issuance of 19 Evacuation Warnings and 10 Evacuation Orders for communities in the valley
- approximately 30 communities isolated by flooding, some for more than a week
- severe damage to some local roads, turf farms and vegetable farms
- several hundred million dollars estimated in direct and indirect damages.

## How big was the March 2021 flood?

The Bureau of Meteorology uses 3 levels to describe floods: minor, moderate and major based on the consequences of flooding at key river gauge heights. The March 2021 flood peaked in the minor range at Wallacia, the moderate range at Penrith, and the major range at North Richmond and downstream. The flood peaked at:

- 10.0m on the local gauge at Penrith (or 24.1m above sea level). There, the flood was the highest since 1925. The height of floodwaters was increased by the significant growth of vegetation in and near the river channel downstream of Victoria Bridge.
- 12.9m above sea level at Windsor. There, the flood was the highest and first major flood since 1990 when the flood peaked at 13.5m. As a recent comparison, the February 2020 flood peaked at 9.3m at Windsor. The largest flood on record was in 1867 at 19.7m above sea level at Windsor, almost 7 metres higher than the March 2021 event.

The March 2021 peak flood levels at key locations in the Hawkesbury-Nepean Valley are listed in table 1 below.

Table 1: Peak level, classification and likelihood of the March 2021 Hawkesbury-Nepean flood

Location	Peak flood level (m above sea level) <sup>1</sup>	Flood classification	Approximate likelihood (1 in X chance per year) <sup>2</sup>
Wallacia Weir	35.2	Minor	1 in 5-10
Penrith	24.1	Moderate	1 in 10-20
North Richmond	14.9	Major	1 in 10-20
Windsor	12.9	Major	1 in 10-20
Sackville	9.7	Major	~1 in 20
Colo Junction (Lower Portland)	7.9	Major	~1 in 30
Webbs Creek (Wisemans Ferry)	4.4	Major	~1 in 30

## Notes:

<sup>1</sup> Peak flood levels are obtained from WaterNSW and Manly Hydraulics Laboratory

<sup>2</sup> Approximate likelihood is based on preliminary results from a 2-dimensional flood model being developed for Infrastructure NSW, and may be subject to change. Modelled flood levels at Penrith have been updated to take account of revegetation in and near the river in recent years.

## How does the March 2021 flood compare with other Hawkesbury-Nepean floods?

The Hawkesbury-Nepean Valley has a long history of flooding, stretching back many thousands of years. The valley has the longest records of any floodplain in Australia, dating from early days of European settlement.

When we compare different floods, we talk about how likely it is that the flood could happen in any given year. The flood in March 2021 is described as having a likelihood of a 1 in 10 (10%) to a 1 in 20 (5%) chance per year at Penrith and Windsor, or a 98% chance of occurring at least once in an 80-year lifetime. There have been 14 floods since records began in the 1790s which exceeded the March 2021 flood peak at Windsor. The March 2021 flood was similar to the April/May 1988 flood which reached 12.8m above sea level at Windsor.



Figure 1: Windsor Bridge underwater during the March 2021 flood. Photo by Adam Hollingworth



For more information about flooding in the Hawkesbury-Nepean Valley, visit [www.myfloodrisk.nsw.gov.au](http://www.myfloodrisk.nsw.gov.au)

For more information about the Flood Strategy, visit [www.insw.com/flood-strategy](http://www.insw.com/flood-strategy)